APPENDIX C
Summary of Environmental Site Conditions

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SUMMARY OF ENVIRONMENTAL CONDITIONS FOR THE SITE

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C-1. SUMMARY OF ENVIRONMENTAL SITE CONDITIONS

This Appendix summarizes the various Parcels that collectively make up the Site and their current environmental conditions. The final environmental conditions of the Site and in-place remedy are thoroughly documented in the RACR, Petroleum Hydrocarbon Closeout Reports, Radiological RACR, and the FOST for each Parcel. As of the date of transfer for each Parcel, the Navy has implemented all petroleum corrective actions and the CERCLA remedy.

The former Navy Parcels that make up the Site include Parcel B-1, IR-7/18 – Lots 1 and 3, Parcel G, Parcel UC-1, and Parcel UC-2. This Appendix provides Parcel-specific summaries of the environmental conditions of the Site. For each Parcel, a general site description, the environmental conditions, a summary of the CERCLA remedy, a description of any areas subject to special protocols under this RMP, and figures depicting key environmental features are presented.

Notwithstanding the known environmental conditions described for each Parcel in this Appendix, the potential exists for unexpected conditions to be encountered at the Site. If unexpected conditions are encountered, appropriate health and safety protocol should be assessed (see Sections 3.1 and 4.1), and the Unexpected Conditions Response Plan should be implemented (see Section 3.8 and Appendix D).

C-1.1 Parcel B-1

Parcel B-1 includes approximately 24.3 acres in the northern area of HPS and is bounded by IR sites 7 and 18 to the northwest (see Section C-1.2), Parcel B-2 and San Francisco Bay (Parcel F) to northeast, and Parcel C and former Parcel A to the south (Figure C-1)[1]. The land surface at Parcel B-1 is mostly paved or covered by structures with the exception of the steep hillsides on the southwest, which are covered by a vegetated soil cover. (Navy, FOST*pending*).

Historically, Parcel B-1 was part of the industrial support area at HPS and used for shipping, ship repair, training, barracks, and offices (Navy, *pending*). As a result of industrial and radiological research activities conducted by the Navy or other tenants in

[1] The area included for Parcel B-1 does not include the 2.6 acres that encompass IR-10 because remediation of this site is ongoing and IR-10 will not be transferred with the remainder of the parcel.

Parcel B-1, the chemicals of concern (COC) released in soil at the Property included metals; VOCs; semivolatile organic compounds (SVOCs), including pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs); and total petroleum hydrocarbons (TPH). Radionuclides of concern at the Property included cesium-137, radium-226, plutonium-239, and strontium-90. COCs in groundwater were VOCs, Chromium VI, and mercury.

C-1.1.1 Environmental Condition

The Navy has completed remedial and removal actions in accordance with the Amended Parcel B ROD (Navy, 2009d). The final RACR for Parcel B-1 Durable Cover installations was submitted in January 2017 (ERRG, 2017), and the FFA signatories have concurred with the final RACR (*List referenced letters when complete*). The final RACR for the soil excavation and stockpile removals at Parcels B, D-1, and G was submitted in October 2011 (ERRG, 2011), and EPA has concurred with this RACR (USEPA, 2014a).

As contemplated in the Amended Parcel B ROD, certain COCs remain in soil, soil vapor, and groundwater at Parcel B-1, at levels and in conditions that the FFA Signatories have determined are consistent with the ROD Remedial Action Objectives (RAO). The COCs that remain in soil at Parcel B-1 include metals, VOCs, SVOCs, pesticides, and PCBs (ERRG, 2015). The COCs that remain in soil vapor are VOCs, including benzene, chloroform, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride in designated VOC ARICs (Sealaska, 2013; ERRG, 2017). The COCs that remain in groundwater include TCE, vinyl chloride and mercury (ERRG, 2017). Along the shoreline areas of Parcel B-1, copper, lead, mercury, and chromium VI were identified in an Amended ROD RAO as ~~compounds~~COCs with trigger levels to protect ecological receptors (ChaduxTt, 2009). Notable environmental conditions are depicted on Figure C-1.

C-1.1.2 CERCLA Remedy

The CERCLA remedy, approved in the Amended Parcel B ROD, included: i) excavation of soil and offsite disposal; ii) a Durable Cover across all of Parcel B as a physical barrier to cut off potential exposure to residual ubiquitous metals in soil; iii) shoreline revetment to protect potential ecological receptors in the Bay; iv) in-situ treatment of groundwater to promote biodegradation of VOCs as a source reduction measure; v) groundwater monitoring; vi) installation of a soil vapor extraction (SVE) system at IR Site 10 to

remove and treat VOCs in soil gas from soil and groundwater in that area as a source reduction measure; vii) institutional controls (IC); and viii) cleanup of radiologically impacted soil and structures.

With the exception of the IR-10 carveout area, the remedial action (RA) at Parcel B-1 was completed in 2012. Soil, soil vapor, and groundwater remediation activities are ongoing in the IR-10 carveout area. The FOST documents the CERCLA remedy that is in place in Parcel B-1 (Navy, *pending*). The EPA, DTSC, and the RWQCB have concurred with the Final FOST (*Reference Approval Letters when complete*). Components of the remedy that remain to ensure that human health and environment are protected from potential long-term health risks include:

- Durable Cover over the entire Parcel to prevent contact with residual ubiquitous metals in soil. The Parcel B-1 Durable Cover is defined as hardscape (e.g., asphalt, building foundations, concrete pads, sidewalks, etc.), two feet of clean imported soil fill, or shoreline revetment as defined in the Amended Parcel B ROD (Navy, 2009d), Remedial Design (ChaduxTt, 2011, 2012), Remedial Action Work Plan (RAWP; ERRG, 2012d) and RACR (ERRG, 2017).
- Groundwater monitoring to verify plume stability or that the groundwater remedy continues to meet the RGs defined in the Amended Parcel B ROD.
- Land use and activity restrictions and institutional controls, implemented through a CRUP and federal quitclaim deed, to prevent or minimize exposure to residual COCs in the soil, soil vapor, and groundwater. The entire Parcel includes restrictions related to the Durable Cover and the ~~soil~~ HPS Bay Fill/Native Soil underlying the Durable Cover.

The requirements for inspection, maintenance, and reporting of these remedy components are provided in the O&M Plan for Parcel B-1 (ERRG, 2016)[2], the Remedial Action Monitoring Plan (ChaduxTt, 2011 and 2012)[3], and Final Basewide Groundwater

[2] The O&M Plan for Parcel B-1 (revised draft final, April 2016) covers the inspections, maintenance, and repairs required for the site-wide Durable Covers and the O&M and monitoring of the IR Site 10 SVE system.

[3] Long-term groundwater monitoring is performed in accordance with the Remedial Action Monitoring Plan and the final BGMP Sampling and Analysis Plan and addenda.

Monitoring Program Sampling and Analysis Plan (CE2-Kleinfelder Joint Venture, 2011a,b, 2012a,b, and 2014)[2], which may be revised from time to time.

The radiological corrective actions in Parcel B-1 are complete and no radiological restrictions remain on Parcel B-1. The California Department of Public Health (CDPH) issued the Radiological Unrestricted Release Recommendation for Parcel B-1 in July 2012 and reinstated the Radiological Unrestricted Release Recommendation for Parcel B in April 2016 stating that Parcel B is suitable for unrestricted use with respect to radiological issues (CDPH, 2012b and 2016).

C-1.1.3 Areas Subject to Special Protocols

The following areas on Parcel B-1 contain environmental conditions that are subject to special protocols as summarized in Section 4 of the RMP. A tabular summary of those areas subject to special protocols is presented in Table C-1.

C-1.1.3.1 Areas Requiring Building Foundation Removal – Construction Worker Health and Safety

The general health and safety protocols outlined in RMP Section 3.1 are in place to maintain the remedy and protect workers from potential impacts to human health, such as those from ubiquitous metals. However, location-specific protocols are required when the Owner is removing building foundations or portions of building foundations in specific locations that expose the HPS Bay Fill/Native Soil. The FFA Signatories have determined that soil beneath certain building foundations at Parcel B-1 may contain unexpected levels of chemicals that have been previously remediated in soil surrounding the buildings, but not under buildings. Specific chemicals of potential concern may include metals, PCBs, PAHs, SVOCs, and/or VOCs. Location-specific health and safety protocols are required, as set forth in Section 4.1, if and when building foundations are removed in the following locations (refer to Figure C-1):

- Building 113 and 113A – Soil excavated from beneath the building slab should be monitored during and after demolition for unexpected conditions. Health and safety protocol should consider the potential presence of PCBs, PAHs, and VOCs.
- Building 146 – Soil excavated from beneath the building slab should be monitored during and after demolition for unexpected conditions. Health and safety protocol should consider the potential presence of lead, cadmium, PCBs, SVOCs, and VOCs.

C-1.1.3.2 Soil with Residual Petroleum

1.1.3.2.1 NFA Areas Without Restrictions

Cleanup and closure of petroleum areas of concern (AOC) or borings of concern within Parcel B-1 has been completed. RWQCB staff issued NFA letters closing the Parcel B-1 petroleum AOCs (RWQCB, 2012a, c-g; 2013b-j). The RWQCB concurred with the Navy's recommendations of NFA with no restrictions and designated the sites as suitable for residential use. Soil in these areas, however, may exhibit some residual visual and/or olfactory evidence of petroleum. The areas where soil may exhibit visual and olfactory evidence of petroleum impacts are: AOCs 7-E and 46-D, which overlap with IR-7/18; 10-C; 23-A; 23-B; 24-B; 24-D; 24-E; 26-A; 46-C; 46-E1; 46-E2; 60-A; and 60-B (depicted on Figure C-1).

Abandoned conveyance pipes coated with a corrosion-resistant tar material containing PAHs may be present below ground surface at Parcel B-1[4], and must be handled in accordance with all applicable federal, state, and local laws and regulations. The pipes and their associated coating material in the subsurface do not present a threat to human health or the environment and will not present a threat to human health or the environment if handled in accordance with applicable laws (Navy, *pending*).

C-1.1.3.3 Groundwater Management Areas

In Parcel B-1, the IR-10 groundwater area contains residual concentrations of VOCs (ERRG, 2015) with exceedances of the vinyl chloride above the RG in wells IR10MW59A, IR10MW61A, and IR10MW71A (CE2-Kleinfelder, 2015b). The location of VOCs in groundwater in IR-10 is identified on Figure C-1. Subsurface work in these areas must comply with standards and protocols as set forth in Sections 3.5, 3.6, and 4.3 of the RMP.

C-1.1.3.4 Soil Vapor Management Areas

Parcel B-1 includes ARICs for VOCs in soil vapor as identified on Figure C-1. Construction of inhabited buildings and subsurface utility corridors within these areas must comply with standards and protocols as set forth in Section 4.4 of the RMP.

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[4] It has been confirmed that petroleum AOC 24-E contains pipes coated with a corrosion-resistant material containing PAHs (RWQCB, 2015b).

C-1.2 Installation Restoration Sites 7 and 18 (IR-7/18)

The area referred to as Installation Restoration Sites 7 and 18 (IR-7/18) consists of approximately 14.2 acres comprised of two adjacent IR sites, IR Site 7, and IR Site 18, located in the northwest corner of Parcel B-1 (See Figure C-2.) IR 7/18 is bounded to the northeast by the San Francisco Bay, non-Navy property to the northwest and southwest, and the remainder of Parcel B-1 to the southeast. Historically, IR-7/18 was created by depositing fill into the Bay, and later expanded with engineered fill materials consisting of local quarried bedrock and some construction debris during the 1950s and 1960s (ERRG, 2012a). Past activities at IR Site 7 include sandblasting and disposal of sandblasting grit and debris and debris associated with decontamination of radiologically contaminated ships involved in atomic weapons testing in the South Pacific. Past activities at IR Site 18 include ground surface releases of waste oil and use of fill materials contaminated with petroleum hydrocarbons. The land surface at IR 7/18 slopes from southeast to northeast toward the Bay. There are no structures present and vegetation consists of plants introduced to stabilize the constructed soil cover. (Navy, 2013a)

Subsequent to preparation of the ROD, IR-7/18 was delineated into three lots to aid in the transfer of the lots that do not have restrictions for ROCs. Lot 1 is located along the southern boundary of IR-7/18, Lot 2 is located in the central and northern portion of IR-7/18, and Lot 3 is located along the eastern boundary of IR-7/18. The COCs at Lots 1 and 3 include metals, VOCs, SVOCs, including pesticides, PCBs, PAH, and TPH. The COCs released in sediment along the shoreline at Lot 3 include metals, pesticides, PCBs, and PAHs.

The RMP, which sets forth certain requirements or protocols that, if followed, will allow certain activities that are otherwise restricted to be performed without additional approval by FFA Signatories, applies to future development work that is conducted in Lots 1 and 3.

This RMP does not apply to any future development work that is conducted in Lot 2. Lot 2 is comprised of the portion of IR-7/18 that is restricted because of the potential presence of ROCs[5]. Any future development work that is conducted in Lot 2 must be conducted in

[5] ROCs that might be present in Lot 2 at depths greater than four feet below the Navy installed surface include cesium-137, radium-226, and strontium-90. The Navy has implemented the CERCLA remedy for

accordance with restrictions set out in the CRUP and deed restrictions for Lot 2 and will require the owner to obtain approval of a Restricted Activities Work Plan for Lot 2 by the FFA Signatories (see Section 2.2.2).

C-1.2.1 Environmental Condition in Lots 1 and 3

For CERCLA purposes, the Navy has historically included IR-7/18 as part of Parcel B. The Navy has completed remedial and removal actions in accordance with the Amended Parcel B ROD (Navy, 2009d). The final RACR for IR-7/18 was submitted in 2012 (ERRG, 2012a) and the FFA Signatories have concurred with the final RACR in their comments to the RACR (USEPA, 2012).

As contemplated in the Amended Parcel B ROD, certain COCs remain in soil and soil vapor at Lots 1 and 3, at levels and in conditions that the FFA Signatories have determined are consistent with the ROD Remedial Action Objectives. The COCs that remain in the soil at IR-7/18 Lots 1 and 3 include metals, VOCs, SVOCs, PCBs, PAHs and TPH (Navy, 2013a). The COC that potentially remain in soil vapor at IR-7/18 Lots 1 and 3 are VOCs. No COCs remain in groundwater. Notable environmental conditions are depicted on Figure C-2.

C-1.2.2 CERCLA Remedy for Lots 1 and 3

The CERCLA remedy for Lots 1 and 3, approved in the Amended Parcel B ROD (Navy, 2009d), included: i) excavation of soil and offsite disposal; ii) a Durable Cover as a physical barrier to cut off potential exposure to residual ubiquitous metals in soil; iii) shoreline revetment to protect potential ecological receptors in the Bay; and iv) ICs.

The RA in IR-7/18 was completed in 2011 and the FOST documents that the IR-7/18 CERCLA remedy is in place. Components of the remedy in Lots 1 and 3 that remain to ensure that human health and environment are protected from potential long-term health risks include:

- A Durable Cover to prevent contact with residual ubiquitous metals throughout IR-7/18 in soil. The IR-7/18 Durable Cover includes a small area of revetment in

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radionuclides in structures and soil at Lot 2, which consists of survey, decontamination, excavation, disposal, groundwater monitoring, and institutional controls.

Lot 3 and soil covers as defined in the Amended Parcel B ROD (Navy, 2009d), Remedial Design (ChaduxTt, 2010), RAWP (ERRG, 2010) and RACR (ERRG, 2012a). Lots 1 and 3 include restrictions related to the Durable Cover.

- Land use and activity restrictions and institutional controls, implemented through a CRUP and federal quitclaim deed, to prevent or minimize exposure to residual COCs in the soil, soil vapor, and groundwater.

The radiological corrective actions in Lots 1 and 3, which included a few small sections of sewer and storm drain removals, are complete and no radiological restrictions remain. CDPH issued a Radiological Unrestricted Release Recommendation for Parcel B, which included the small sections of sewer and storm drain removals in these lots, in July 2012 (CDPH, 2012b).

C-1.2.3 Areas Subject to Special Protocols

The following areas on IR-7/18 Lots 1 and 3 are subject to special protocols as summarized in Section 4. A tabular summary of those areas subject to special protocols is presented in Table C-1.

C-1.2.3.1 Soil with Residual Petroleum

1.2.3.1.1 NFA Areas Without Restrictions

Cleanup and closure of petroleum AOCs within IR-7/18 Lots 1 and 3 have been completed. AOCs located in or partially in Parcel B IR-7/18 Lots 1 and 3 include 7-B, 7-E, 18-B, and 46-D. RWQCB staff issued NFA letters closing the IR-7/18 petroleum areas of concern in 2012 (RWQCB, 2012a,b,f), concurring with the Navy's individual site closeout reports' recommendation for NFA with no restrictions. The Durable Cover and institutional controls designed to be protective of exposure to the other COCs at IR-7/18 (metals and organic chemicals) also provides protection from exposure to any residual petroleum materials in the subsurface (Navy, 2013a). Soil in these areas, however, may exhibit residual visual and/or olfactory evidence of petroleum. The areas where soil may exhibit visual and olfactory evidence of petroleum impacts in Lots 1 and 3 are AOCs 7-B, 7-E, 18-B and 46-D (RWQCB, 2012a,b).

C-1.2.3.2 Soil Vapor Management Areas

The entirety of Lots 1 and 3 in IR-7/18 are included in an ARIC for VOCs in soil vapor as identified on Figure C-2. Construction of inhabited buildings and utility corridors

within these areas must comply with standards and protocols as set forth in Section 4.4 of the RMP.

C-1.3 Parcel G

Parcel G includes about 40 acres in the central area of HPS and is bounded by Parcels UC-1 to the north, Parcels C and D-1 to the east, Parcels D-1 and E to the south, and Parcels E and UC-1 to the west (Figure 1-1) (Navy, 2015c). The land surface at Parcel G is entirely covered with a Durable Cover (hardscape) that consists of asphalt, concrete, or building foundations and slopes gently from northwest to southeast toward the bay (Navy, 2015c).

Historically, Parcel G was part of the industrial support area at HPS and used for shipping, ship repair, laboratory, office and commercial activities (Navy, 2007). As a result of past industrial activities in Parcel G, the COCs released in soil include metals; VOCs; SVOCs, including pesticides; PCBs; PAHs; and TPHs. ROCs at the Property include cesium-137, radium-226, and strontium-90. COCs in groundwater are primarily VOCs and selected metals.

C-1.3.1 Environmental Condition

The Navy has completed remedial and removal actions in accordance with the Parcel G ROD (Navy, 2009c). The final RACR for the soil excavation and stockpile removals at Parcels B, D-1, and G was submitted in October 2011 (ERRG, 2011). The final RACR for Parcel G was submitted in 2014 (Arcadis, 2014a) and the FFA Signatories have concurred with the final RACR (USEPA, 2014a,b).

As contemplated in the Parcel G ROD, certain COCs remain in soil, soil vapor, and groundwater at Parcel G at levels and in conditions that the FFA Signatories have determined are consistent with the ROD Remedial Action Objectives. The COCs that remain in soil above the RGs and ALs include metals, including arsenic, chromium VI, cobalt, lead, and manganese, and PAHs benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene (Navy, 2009c; Navy, *pending*). COCs in soil vapor that remain at Parcel G include the VOCs benzene, carbon tetrachloride, chloroform, tetrachloroethene (PCE), and TCE and their degradation products (Sealaska, 2013). COCs that remain in A-aquifer groundwater include VOCs benzene, carbon tetrachloride, chloroform, PCE, TCE, their degradation products, and total xylenes (Navy, 2010c; Arcadis, 2014a). COCs are not present in B aquifer groundwater at levels that may pose a health risk (Navy,

2009c). COCs are not present in groundwater in the A or B aquifers at levels that may pose potential environmental impacts to the Bay. However, the Navy continues to conduct groundwater monitoring for chromium VI to confirm that concentrations remain below the RG (ERRG, 2014b). Notable environmental conditions at Parcel G are depicted on Figure C-3 and further described in the following Sections.

C-1.3.2 CERCLA Remedy

The CERCLA remedy, approved in the Parcel G ROD, included: i) excavation and offsite disposal of soil in selected areas; ii) installation of Durable Covers across all of Parcel G as physical barriers to cut off potential exposure to soil; iii) removal of two soil stockpiles and offsite disposal; iv) active groundwater treatment by injection of zero-valent iron (ZVI) or a biological substrate to destroy VOCs and treat hexavalent chromium in groundwater; v) long-term groundwater monitoring; vi) a soil vapor survey; vii) ICs; and vii) cleanup of radiologically impacted soil and structures.

The RA in Parcel G was completed in 2014 and the FOST documents that the Parcel G CERCLA remedy is in place. The USEPA, DTSC, and RWQCB have concurred with the FOST (USEPA, *pending*; RWQCB, *pending*; DTSC, *pending*). Components of the remedy that remain to ensure that human health and environment are protected from potential long-term health risks include:

- A Durable Cover over the entire Parcel to prevent contact with residual ubiquitous metals in soil. The Parcel G Durable Cover is defined as hardscape (e.g., asphalt, building foundations, concrete pads, sidewalks, etc.) in the ROD (Navy, 2009c), Remedial Design (RD; Navy, 2010b), RAWP (Arcadis, 2012) and RACR (Arcadis, 2014a and ERRG, 2014a). The entire Parcel includes restrictions related to the Durable Cover.
- Groundwater monitoring to verify plume stability or that the remedy continues to meet the RGs defined in the Parcel G ROD.
- Land use and activity restrictions and ICs, implemented through a CRUP and federal quitclaim deed, to prevent or minimize exposure to residual COCs in the soil, soil vapor, and groundwater.

The radiological corrective actions in Parcel G are complete and no radiological restrictions remain on Parcel G. CDPH issued the Radiological Unrestricted Release

Recommendation for Parcel G in 2012 and reinstated the Radiological Unrestricted Release Recommendation for Parcel G in April 2016 stating that Parcel G is suitable for unrestricted use with respect to radiological issues (CDPH, 2012a and 2016).

C-1.3.3 Areas Subject to Special Protocols

The following areas on Parcel G are subject to special protocols as summarized in Section 4. A tabular summary of those areas subject to special protocols is presented in Table C-1.

C-1.3.3.1 Areas Requiring Building Foundation Removal - Construction Worker Health and Safety

The FFA Signatories have determined that soil beneath certain building foundations at Parcel G may contain unexpected levels of chemicals that have been previously remediated in soil surrounding the buildings. Specific chemicals of potential concern include PCBs, PAHs, metals, petroleum hydrocarbons and VOCs. Location-specific health and safety protocols are required, as set forth in Section 4.1, if and when building foundations are removed in the following locations (refer to Figure C-3):

- Building 366 – Soil excavated from beneath the building slab should be monitored during and after demolition for unexpected conditions. Health and safety protocol should consider the potential presence of chlorinated VOCs, PAHs, TPH, and metals (lead and antimony).
- Building 408 – Soil excavated from beneath the former building slab should be monitored during and after demolition for unexpected conditions. Health and safety protocol should consider the potential presence of PCBs, PAHs, chlorinated VOCs, TPH, and metals (lead and cadmium).
- Building 411 – Soil excavated from beneath the building slab should be monitored during and after demolition for unexpected conditions. Health and safety protocol should consider the potential presence of PCBs, PAHs, chlorinated VOCs, TPH, and metals (lead, cadmium, chromium, hexavalent chromium, nickel and mercury).
- Building 418 – Soil excavated from beneath the building slab should be monitored during and after demolition for unexpected conditions. Health and safety protocol should consider the potential presence of PCBs, PAHs, chlorinated VOCs, TPH, and metals (lead, cadmium, chromium, hexavalent chromium, copper and zinc).

- Building 436 – Soil excavated from beneath a portion of the building slab should be monitored during and after demolition for unexpected conditions. Health and safety protocol should consider the potential presence of PCBs, chlorinated VOCs, benzene, toluene, ethylbenzene, xylenes, and metals (lead, cadmium and mercury).
- Building 439 – Soil excavated from beneath the building slab should be monitored during and after demolition for unexpected conditions. Health and safety protocol should consider the potential presence of PCBs chlorinated VOCs, benzene, toluene, ethylbenzene, xylenes, and metals (lead, cadmium and mercury).

C-1.3.3.2 Soil with Residual Petroleum

1.3.3.2.1 NFA Areas Without Restrictions

RWQCB staff issued NFA letters closing the Parcel G petroleum corrective action areas in 2011 (RWQCB, 2011a-h), determining that residual contamination left-in-place is below PSCs and pose no significant risk to human health or the environment. As such, soil in these areas, may exhibit residual visual and/or olfactory evidence of petroleum. The areas where soil may exhibit visual and olfactory evidence of petroleum impacts are: AOCs 33-A, 33-B, 33-C, 37-A, 45D-A, and 65-A, and borings IR34B018, IR34B023, IR71B008, and PA45TA00. These areas are depicted on Figure C-3. This soil may be managed without restriction, subject to the protocol in Section 4.2.2.2 of the RMP unless an unexpected condition is encountered, such as evidence of free petroleum liquid or petroleum sheen on the soil, in which case, soil management will follow the protocol in Section 3.8.

Pipes coated with a material containing PAHs may be present below ground surface at various locations at the Property. PAHs are regulated substances and must be handled in accordance with all applicable federal, state, and local laws and regulations. The Navy, in consultation with EPA, DTSC, and the Water Board, has determined that the pipes and associated coating material in their existing subsurface condition do not present any threat to human health or the environment, and will not present any threat to human health or the environment if and when removed and handled in accordance with applicable laws. (Navy, *FOSTpending*).

C-1.3.3.3 Land Use Restriction Areas

There are areas of Parcel G where residential use is restricted because there are COCs in soil above residential Action Levels including the metals arsenic, chromium VI, cobalt, lead, and manganese, and the PAHs benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene, as depicted on Figure C-3. These areas are subject to soil handling and management protocols described in Sections 3.4 and 4.2.

C-1.3.3.4 Groundwater Management Areas

The COCs in groundwater at Parcel G are a limited number of VOCs.

COCs at the former IR-09 plume included chloroform, methylene chloride, and TCE and degradation products. Groundwater remediation performance monitoring continues at the former impacted area in IR-09 North. The former IR-09 plume is not expected to pose a vapor intrusion risk to future residents based on COC concentrations less than RGs.

COCs at the former IR-33 plume included benzene, carbon tetrachloride, chloroform, naphthalene, TCE and degradation products, and total xylenes. Groundwater remediation performance monitoring continues at the former impacted area in IR-33 for carbon tetrachloride and chloroform at well IR33MW64A. Groundwater remediation performance monitoring at the former impacted area in IR-33 has been discontinued for benzene, naphthalene, TCE, and total xylenes. Well IR33MW64A is located in a designated ARIC for VOCs in soil vapor. Soil vapor sampling results in the general area located outside the ARIC for VOCs in soil vapor in 2010 did not indicate concentrations that would pose an unacceptable risk to potential future residential receptors via vapor intrusion under documented site conditions.

COCs at the former IR-71 plume included carbon tetrachloride, chloroform, and PCE, TCE, and degradation products. Groundwater remediation performance monitoring continues at the former impacted area in IR-71 East for PCE, TCE and vinyl chloride at wells IR71MW03A and IR71MW04A. At the IR-71 plume, PCE and TCE are present in groundwater at concentrations that slightly exceed their respective RGs, but concentrations of these COCs have demonstrated an overall decreasing trend since groundwater treatment in 2008. Although concentrations of PCE and TCE in groundwater at the IR-71 plume (well IR71MW03A) slightly exceed the RG, soil vapor concentrations in the vicinity of well IR71MW03A do not present a significant VI risk to residential receptors (Sealaska, 2013).

Chloroform was identified as a COC at non-plume wells IR44MW08A and IR09MW44A. Groundwater remediation performance monitoring was discontinued at wells IR44MW08A and IR09MW44A in 2012 and 2008, respectively.

Work in these areas must comply with standards and protocols as set forth in Sections 3.5, 3.6 and 4.3 of the RMP.

C-1.3.3.5 Soil Vapor Management Areas

Parcel G includes ARICs for VOCs in soil vapor as identified on Figure C-3. Construction of utility corridors and inhabited buildings within these areas must comply with standards and protocols as set forth in Section 4.4 of the RMP.

C-1.4 Parcels UC-1 and UC-2

Parcel UC-1 includes a portion of Spear Avenue and is bounded on the north by Parcels A and D-2, on the east by Parcel UC-2, on the south by Parcels E and G, and on the west by Parcel UC-3 (Figure 1-1). Historically, most of the area associated with Parcels UC-1 and UC-2 has been a paved roadway or parking area. Parcel UC-1 is nearly completely paved and includes two buildings, associated asphalt parking areas, and a small unpaved hillside area. Parcel UC-2 includes portions of Fisher Avenue and Robinson Street and is bounded on the north, east, and south by Parcel C and on the west by Parcel UC-1 and former Parcel A. Historical use of the southern portion of Parcel UC-2 is as a roadway (Fisher Avenue), and the northern portion is as a triangularly shaped parking lot. The property is mostly paved, except for the steep unpaved hillside bordering Fisher Avenue, which is covered by vegetation (Navy, 2015b).

C-1.4.1 Environmental Condition

Certain COCs remain in soil, soil vapor, and groundwater at Parcels UC-1 and UC-2 at levels and in conditions that the FFA Signatories have determined are consistent with the ROD Remedial Action Objectives. The COCs that remain in soil at Parcels UC-1 and UC-2 include naturally occurring metals (specifically, arsenic and manganese) and PAHs (Navy, 2009a,b). COCs for Parcels UC-1 and UC-2 in soil vapor that remain include VOCs (specifically, benzene, chloroform, TCE, vinyl chloride and their degradation products; ERRG, 2014b). COCs in groundwater in Parcel UC-2 include carbon tetrachloride and chloroform and are not anticipated to be present at levels that pose a

health risk from dermal exposure and inhalation to construction workers (Navy, 2009a,b). Notable environmental conditions are depicted on Figure C-4.

C-1.4.2 CERCLA Remedy

The FOST documents that the CERCLA remedy in Parcels UC-1 and UC-2 is in place (Navy, 2015b). The EPA, DTSC, and RWQCB have concurred with the FOST (USEPA, 2015c; DTSC, 2015; RWQCB, 2015a). Components of the remedy that remain to ensure that human health and environment are protected from potential long-term health risks include:

- Durable Covers over the entire Parcel to prevent contact with residual ubiquitous metals. The Parcels UC-1 and UC-2 Durable Cover is defined as hardscape (e.g., asphalt, building foundations, concrete pads, sidewalks, etc.) or two feet of clean imported soil fill in the RODs (Navy, 2009a and 2009b), RD (Navy, 2010a), and RAWP (ERRG, 2012b).
- Groundwater monitoring at Parcel UC-2 to verify that natural attenuation continues to progress and to meet the RGs defined in the UC-2 ROD (Navy, 2009a).
- Land use and activity restrictions and institutional controls, implemented through a CRUP and federal quitclaim deed, to prevent or minimize exposure to residual COCs in the soil, soil gas, and groundwater. The entire Parcel includes restrictions related to the Durable Cover.

The requirements for inspection, maintenance, and reporting of these components of the remedy are provided in the O&M Plan for Parcels UC-1 and UC-2 (Navy, 2013b), which may be revised from time to time. The O&M Plan requires that the owner conduct regular inspections and prepare an Annual Inspection Report to summarize the inspection findings for each year. These long-term O&M obligations are independent of the RMP requirements and it is the Owner's responsibility to comply with the most current version of the O&M Plan.

The radiological corrective actions in Parcels UC-1 and UC-2 are complete, and no radiological restrictions remain on Parcels UC-1 and UC-2. The CDPH issued the Radiological Unrestricted Release Recommendation for Parcels UC-1 and UC-2 in 2011

stating that Parcels UC-1 and UC-2 are suitable for unrestricted use with respect to radiological constituents (DTSC, 2011a).

C-1.4.3 Areas Subject to Special Protocols

The following areas on Parcels UC-1 and UC-2 are subject to Special Protocols as summarized in Section 4. A tabular summary of those areas subject to special protocols is presented in Table C-1.

C-1.4.3.1 Groundwater Management Areas

Carbon tetrachloride and chloroform have been detected in groundwater at Parcel UC-2 (remediation performance monitoring wells IR06MW54F and IR06MW55F) but have not been associated with an identified source (Figure C-4). Except for this localized area, Parcel UC-2 is upgradient of other areas of groundwater contamination at HPS. The Navy ROD for Parcel UC-2 selected monitored natural attenuation as the remedy for the low concentrations of carbon tetrachloride and chloroform in groundwater in the vicinity of groundwater remediation performance monitoring wells IR06MW54F and IR06MW55F. Groundwater is currently being monitored by the Navy in remediation performance monitoring wells IR06MW54F and IR06MW55F as a component of the Basewide Groundwater Monitoring Program. Soil vapor sampling results collected in this area in 2010 identified that concentrations were below the level that would pose a risk to potential future residential receptors via vapor intrusion under documented site conditions. Work in these areas must comply with standards and protocols as set forth in Sections 3.5, 3.6 and 4.3 of the RMP.

C-1.4.3.2 Soil Vapor Management Areas

Parcels UC-1 and UC-2 include ARICs for VOCs in soil vapor as identified on Figure C-4. Utility work in these areas must comply with standards and protocols as set forth in Section 4.4 of the RMP.

TABLE C-1

Geosyntec consultants

TABLE C-1
AREAS SUBJECT TO SPECIAL PROTOCOLS
Phase II Development Area
Former Hunters Point Shipyard, San Francisco, California

SPECIAL PROTOCOL	PARCEL CONDITION														
	Parcel B-1			IR-7/18 Lots 1 and 3			Parcel G			Parcel UC-1			Parcel UC-2		
	Soil	Soil Vapor	Groundwater	Soil	Soil Vapor	Groundwater	Soil	Soil Vapor	Groundwater	Soil	Soil Vapor	Groundwater	Soil	Soil Vapor	Groundwater
Areas Requiring Building Foundation Removal - Construction Worker Health and Safety (RMP Section 4.1)	✓					✓									
Soil with COCs above RGs or PSC (RMP Section 4.2.1)															
Residual Petroleum - NFA areas with restrictions (RMP Section 4.2.2.1)															
Residual Petroleum - NFA areas without restrictions (RMP Section 4.2. 2.2)	✓		✓		✓										
Land Use Restriction Areas (RMP Section 4.2. 3)							✓								
Groundwater Management Areas (RMP Section 4.3)			✓(2)						✓(2)						✓(2)
Soil Vapor Management Areas (RMP Section 4.4)		✓(1)			✓(1)			✓(1)			✓(1)			✓(1)	

Notes

(1) Note location of ARICs for VOCs in soil vapor on Figures C-1 through C -4. Owner must submit an Activity Specific Work Plan that addresses a soil vapor survey or planned vapor intrusion mitigation.

(2) COCs remain in groundwater in remediation performance monitoring wells as documented in this Appendix. Development work within a certain radial distance from a well with COCs in groundwater as specified in the most current EPA Vapor Intrusion Guidance must review the current Navy Basewide Groundwater Monitoring data and follow the protocol specified in the RMP as appropriate to address vapor intrusion risk for the current conditions.

FIGURE C-1

FIGURE C-2

FIGURE C-3

FIGURE C-4

C-2. REFERENCES

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